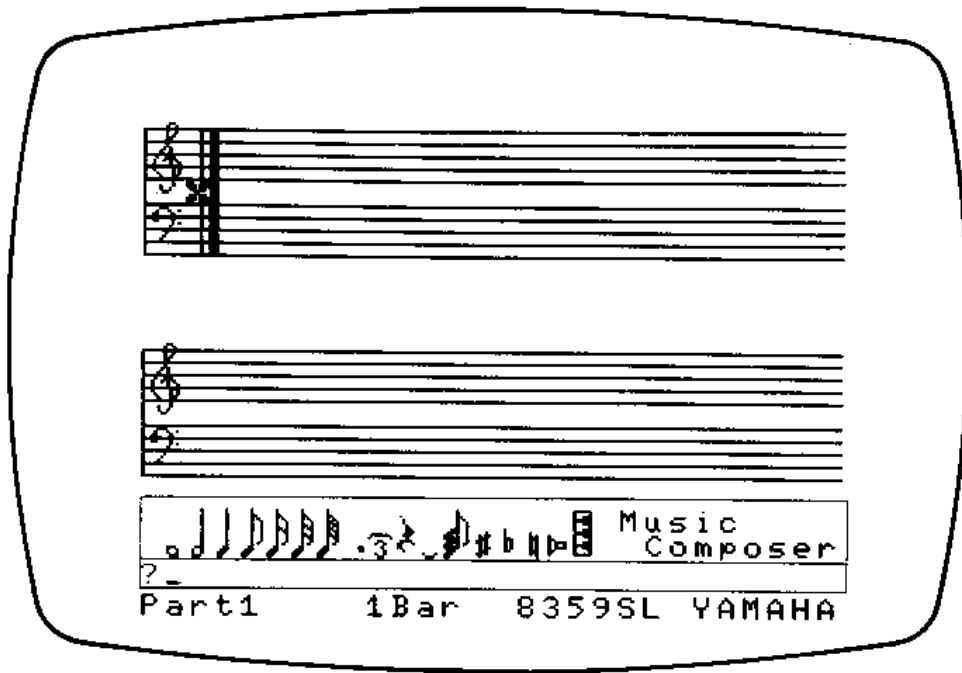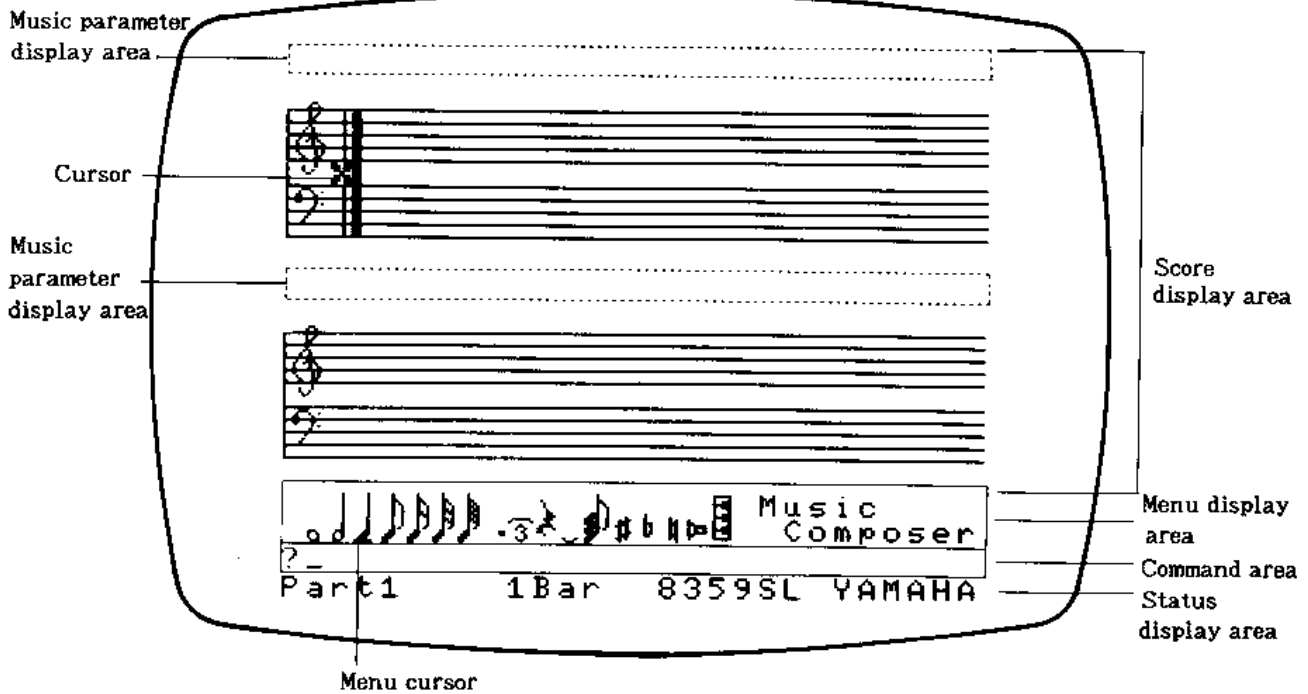Fig. 2 Screen display when the power is turned ON.

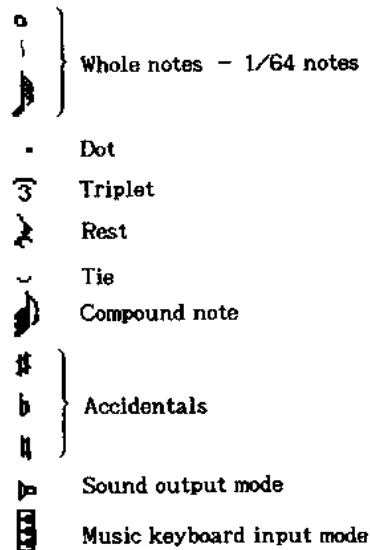The screen display is composed of the sections shown in Fig. 3.

(1) Score display area

The great staff (bass and treble) is displayed on two levels. Notes and musical signs are displayed on the staff. The cursor displays the input position of the notes and performance signs. It also indicates the pitch.

The two-level great staff flows from the upper level into the lower level and constitutes a single part. The area above the score is the musical sign area used to display music parameters such as dynamic markings, etc.

(2) Menu display area

The parameters used for entering notes are displayed here. The various parameters and their meanings are explained below.

    Whole notes — 1/64 notes

    ·   Dot

    3   Triplet

    Rest

    Tie

    Compound note

    Accidentals

    Sound output mode

    Music keyboard input mode

The color of the parameter displayed will be reversed when selected. Selection of these signs is outlined on page

(3) Command Area

The FM Music Composer has two data input modes.

(1) Note mode: used for the input of notes and rests

(2) Command mode: used to input playback data other then notes and rests (dynamics, tempo, repeat, etc.) and also for input of control commands.

These two modes are selected with the SELECT key.

The current mode is indicated by either of the two following signs on the left edge of the command area.

♯ → Note mode

? → Command mode

The display will be set to "?" (Command mode) when the power is turned on. The display will change to "♯" (Note mode) if the SELECT key is pressed once. Pressing it once again will return the display to "?" (Command mode).

Commands are entered in the Command mode by keying in the command into the command area following ? and then pressing the RETURN key.

(4) Status display area

Information for the input of data onto the score and reference information is displayed on the bottom of the screen. The meaning of the information is as follows:

Part: this is the part number of the score displayed on the screen

Bar: this indicates the number of the first bar displayed

SL: this is the display for the memory used for the storing of playback data. It indicates the remaining number of steps which can be entered. Each musical datum is considered to be one step. The indicated value will decrease by one every time there is an input of musical data. The 32Kb RAM model will display 8239 SL and the 16Kb RAM model will display 2898 SL when the power is turned on.

KEYBOARD OPERATIONS

The CX5M keyboard can be used for both data input and for the following operations.

SELECT switching between Command and Note modes

(1) Keys used in the Command mode

DEL BS   these keys move the command area cursor one position to the left to delete mistakenly keyed-in characters

RETURN   enters command input data

CTRL+STOP interrupts playback and copying

F1 - F10   these are function keys assigned to the following commands. These keys allow a command to be entered by pressing only a single key.

F1   part =   (sets part)

F2   bar =   (sets bar)

F3   poly =   (sets the polyphonic note mode)

F4   copy =   (copies the score)

F5   play =   (starts playback)

F6 (SHIFT + F1)   csave =   (saves playback data)

F7 (SHIFT + F2)   cload =   (loads playback and tone data)

F8 (SHIFT + F3)   time =   (sets time)

F9 (SHIFT + F4)   tempo =   (sets tempo)

F10 (SHIFT + F5)   print =   (prints out the score)

(2) Keys used in the Note mode

INS   switches between Insert mode and normal mode

DEL BS deletes the data to the left of the cursor

Cursor keys   move the cursor

RETURN enters the note shown on the menu

1 − 7 selects the note

SHIFT + 1 − 7 enters a rest

8   sets a dot

9   sets a triplet

0   sets a rest
−   moves the menu cursor to the left

∧   moves the menu cursor to the right

¥   sets the desired sign by using the menu cursor

Y   sets a tie

U   sets compound note input

I   sets # ⎫
                ⎪
O   sets b ⎬   only necessary for menu input
                ⎪
P   sets (⎭

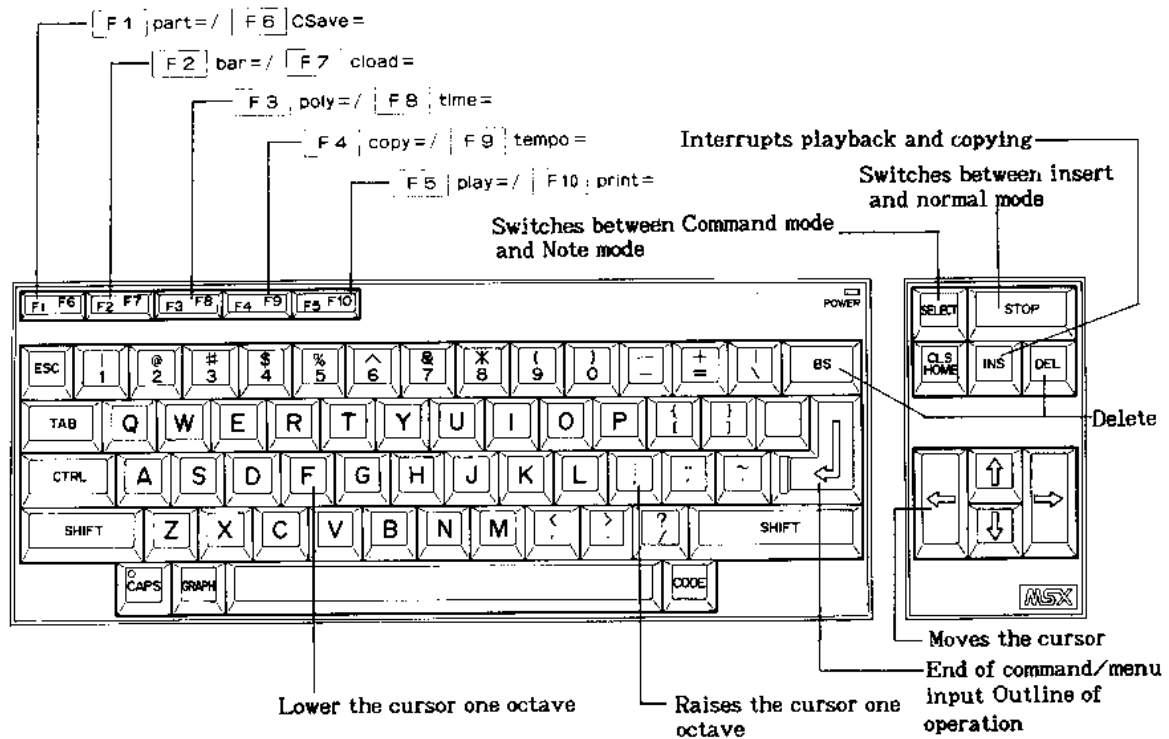@   sets the sound output mode

[sets input from the music keyboard

F   lowers the cursor by one octave

:／   raises the cursor by one octave

V B N M , . ／ − G H K L ; inputs notes

Fig. 4 Key functions

F 1 part = / F 6 CSave =
F 2 bar = / F 7 cload =
F 3 poly = / F 8 time =
F 4 copy = / F 9 tempo =
F 5 play = / F 10 print =

Interrupts playback and copying

Switches between insert and normal mode

Switches between Command mode and Note mode

Delete

Lower the cursor one octave

Raises the cursor one octave

Moves the cursor

End of command/menu input Outline of operation

OUTLINE OF OPERATION

* The FM Music Composer enters notes, rests, tempo and dynamics parameters, voice numbers and other music parameters directly onto the scoreplayback signs directly onto the score.

* The score can be written in a maximum of 8 parts which will play simultaneously when the PLAY command

* Each note or parameter is handled as a single instruction. The maximum number of data which can be entered depends on the RAM capacity of the CX5M. 8359 notes/parameters can be entered with the 32Kb model. Approximately 1000 units of memory capacity are taken up by voice data when voices created with the FM Voicing program are loaded. The number of data which can be entered will be reduced accordingly.

Note:

The processing capacity of the computer may be insufficient when simultaneous trill playback of a large number of parts or other concentrated large-scale processing performance techniques are attempted; as a result, the tempo may be reduced.

8

I-2 CREATION OF SCORES (Playback data)

THE CURSOR

The staff shown in Fig. 2 (page 4) will be displayed when the power is turned on. The score is created by entering notes and parameters onto this staff. The data input onto the score can be divided into notes and parameterss. Notes and rests are entered in the Note mode while music parameters are entered in the Command mode. The input position on the score is indicated by the cursor. The note or music parameter will appear on the score after it is entered and the cursor will move one position to the right. The cursor moves to the lower level when it reaches the right edge of the upper level. The entire score is scrolled up when the cursor reaches the right side of the lower level (refer to Scrolling pg. 17). The cursor can only be moved by the cursor keys when in the Note mode. The <— key moves the cursor to the left and the —> key moves the cursor to the right. The cursor will not move into empty areas of the score.

SETTING THE PART

The FM Sound Synthesizer unit allows a maximum of 8 notes and 8 voices to be played simultaneously. The FM Music Composer corresponds with this by allowing independent input of up to 8 parts. Thus, setting the parts is the first step in creating a score.

Procedure for setting parts

(1) In the Note mode, push the SELECT key to switch to the Command mode.

(2) Push the F1 key which is equivalent to "parts = " and then set the numeric value (1-8) corresponding to the part to be entered.

(3) Push the RETURN key to complete the input. The new part number will be displayed.

* The part number is 1 when the power is turned on.

SETTING THE KEY

The key may be chosen freely. For example, A major is indicated by three sharps (#) and F major is indicated by one flat (b). Because these sharps and flats (# and b) appear at the beginning of the score as the key signature, they need not be specifically written out for each note, which makes the score easier to read. The key should always be entered unless the song is in the key of C major or A minor (which of course have no sharps or flats).

Input of the key signature

(1) When in the Note mode, press the SELECT key to switch to the Command mode.

(2) Following the form "key =X", input the mark X corresponding to the key signature. These key commands are shown in Table 1. For example, A major can be entered as key = A, key = f# or key = 3#.

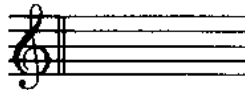(3) Input is completed by pressing the RETURN key. The key signature will appear at the top of the score.

Table 1: Key signatures and corresponding input symbols

Key signature	G	D	A	E	B	F♯	C♯	
Input	e	b	f♯	c♯	g♯	d♯	a♯	Any of these can be entered.
(X =)	1♯	2♯	3♯	4♯	5♯	6♯	7♯	

Key signature	F	B♭	E♭	A♭	D♭	G♭	C♭	
Input	d	g	c	f	b♭	e♭	a♭	Any of these can be entered.
(X =)	1♭	2♭	3♭	4♭	5♭	6♭	7♭	

Key signature	C	
Input	a	Any of these can be entered.
(X =)	0	

* Flats (b) are entered as a lower case letter b.

* Upper case letters are input by pressing the letter key while holding down the SHIFT key.

TIME SIGNATURE AND BARS

(1) When in the Note mode, press the SELECT key to switch to the Command mode.

(2) Input the time signature in the form "time = a/b".(a = 2 − 10,12,16 and b = 2,4,8,16). For example, if the time signature is three-quarters, time = 3/4 is entered in. "time = " can be entered by only pressing the F8 key (SHIFT key + F3 key).

(3) Press the RETURN key to complete input. The time signature will appear at the top of the score.

* The time signature only appears on the treble section.

* 4/4 time is the "default" time signature if no other time signature is set.

* The time signature can be changed in the middle of a song.
The bars will automatically be located according to the time signature. Notes that exceed the bar time limit will appear in the next bar. Be careful with the input notes in order to prevent this from occuring. For example, in 4/4 time, notes are entered as shown in Fig. 5.

Fig. 5 Location of the bar

The bar line appears at this position.
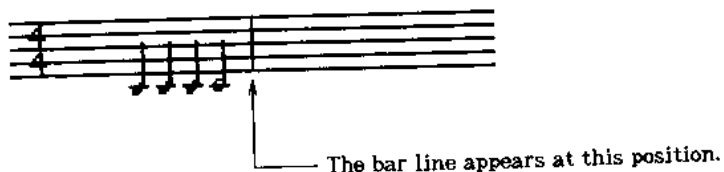
In some cases, the bar may appear in the wrong place. The original position can be reset by designating the part.

ENTERING NOTES

First length and then pitch must be specified when notes are entered. The first to be set are the time values of notes, and dots, triplets, ties, and accidentals, if any.

<1> Setting the note, dot signs, triplet signs, tie signs and accidentals

These appear in the menu display area of the screen and are selected in the Note mode by pressing the SELECT key. There are two ways to select thems.

(1) Selection using the menu cursor

This method uses the red – mark (menu cursor) which appears in the menu display area.

1) Move the cursor to the position of the desired symbol by using the – key (moves the cursor to the left) and the ^ key (moves the cursor to the right).

2) Press the ¥ key to select the parameter which will appear at the position of the menu cursor. The color of the parameter marking will be reversed when selectedd. The selection can be cancelled by pressing the ¥ key again.

3) Repeat the above steps 1 and 2 to select any of the desired signs.

(2) Selection from the CX5M keyboard

Parameters may also be selected by pressing the keys which, shown in Fig. 6, correspond to them. The color of the selected mark will be reversed. The selection can be cancelled by pressing the key again.

Fig. 6 Keys used for selecting parameters on the menu
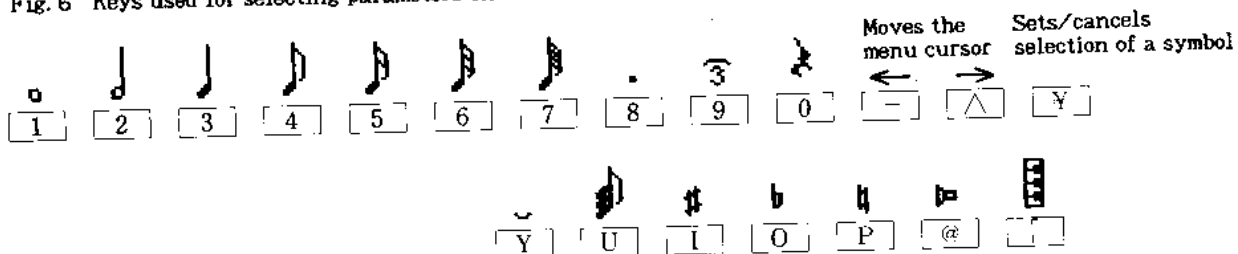
The next step is to set the pitch of the notes. Note input is complete when the pitch setting is added to the previously set parameters. The note will then appear on the score.

<2> Setting the pitch --> entering notes

The pitch is set in the Note mode by using the SELECT key. The following three methods can be used interchangeably to set the pitch.

(1) Setting the pitch by the cursor

1) Set the cursor to the position on the staff corresponding to the desired pitch. The cursor is moved by the ⬆ key which moves the cursor up and the ⬇ key which moves the cursor down.

2) Sharps and flats are added by the previously described procedure.

3) Input is completed by pressing the RETURN key. The notes will then appear on the score.

(2) Setting from the CX5M keyboard

The keyboard is arranged, as shown in Fig. 7, in a one octave C – C 13 note configuration similar to a piano keyboard. When notes are directly entered by pushing the desired keys, the previously set key signature will be ignored. The keys are arranged over a range of one octave, but the octave can be raised or lowered by the octave up and octave down keys, allowing notes to be entered anywhere on the score. The present selection range is one octave, including the position of the cursor.
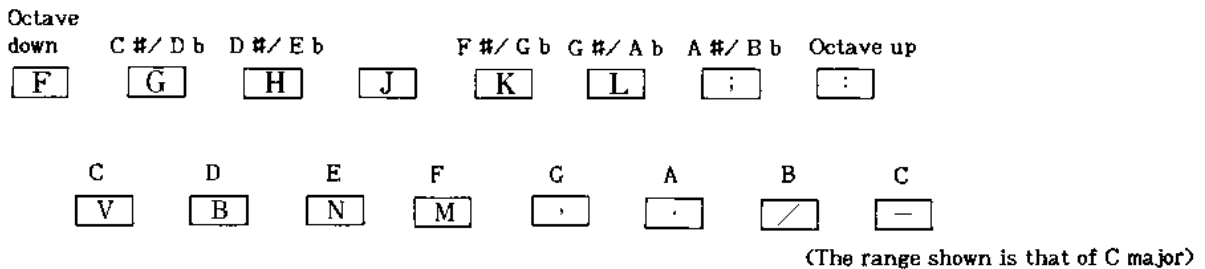
Fig. 7. Keys used for entering notes

Octave down	C #/ D b	D #/ E b		F #/ G b	G #/ A b	A #/ B b	Octave up
F	G	H	J	K	L	;	:

C	D	E	F	G	A	B	C
V	B	N	M	,	.	/	—

(The range shown is that of C major)

Fig. 8. Relationship between the position of the cursor and the selected range

When the : key is pushed

Selected one octave

Selected one octave

When the F key is pushed

Selected one octave

Fig. 17 Shape of the cursor

* (green)   INS key   + (red)
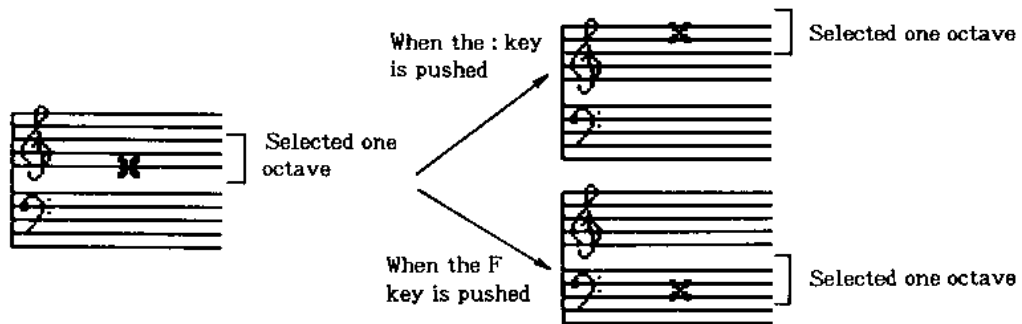
Normal cursor   Insertion mode cursor

Fig. 18 Inserting

To insert data into this place, move the cursor to the position immediately to the right. (Press the INS key to switch to the insert mode)
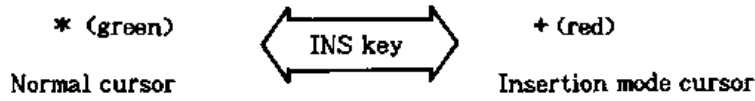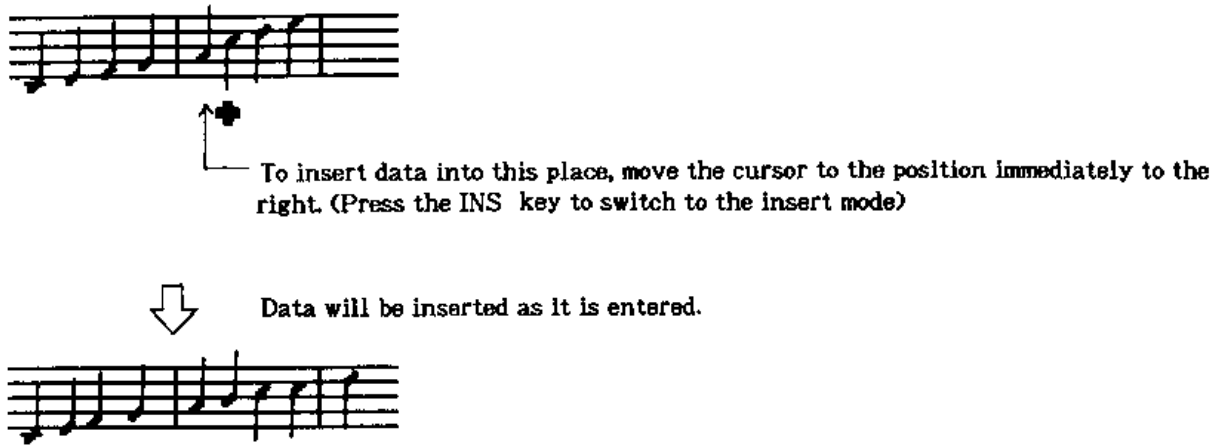
Data will be inserted as it is entered.

I-3 INPUT OF AN ACTUAL SCORE

The following procedure will input the following score and automatically play it back.

The first step is to turn on the power.

Fig. 19 Liebstraume No.3   by Listz

(1) Setting the part

This score is arranged with three parts. Part 1 is entered first. Part 1 is automatically selected when the power is turned ON. Set the input mode to the Command mode. For input on part 1, push the RETURN KEY.

(2) Setting the key

There is one sharp (#) beside the treble clef at the left of the score. This is the key signature, which shows that this piece is in G major. There is no need to mark the sharps for the F notes on this score, since they are already indicated in the key signature at the beginning.

Set the input mode to the Command mode.

Input "key = 1#" and press the RETURN key.

One # will be displayed on the score. (The key signature is only indicated in the treble cleff)

Fig. 20 Input of "key = 1#"

(3) Input of the time signature

The time signature follows the key signature. This piece is in 6/4 time (6 quarter notes/bar). When this time signature is entered into the FM Music Composer, the bars will automatically be located accordingly. Set the input mode to the Command mode.

Input "time = 6/4" and press the RETURN key.

6/4 will be displayed on the score.

Fig. 21 Input of "time = 6/4"
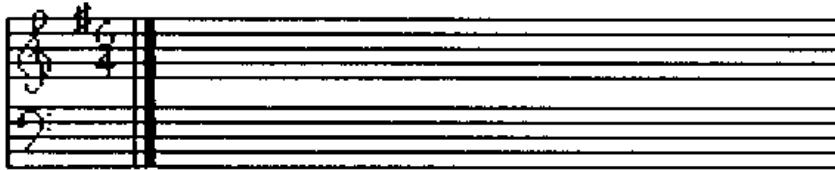
(4) Notes and rests

The next step is to input the notes. Press the SELECT key to switch the input mode to the Note mode. There are various ways to input note and rest data but the following describes input by way of the CX5M keyboard.

The first note is a D in the C major scale (the C, D, E notes described will be those of the C major scale). This piece starts with an incomplete bar. In other words, the time signature of this piece is 6/4 and thus, there must be notes equal to 6 quarter notes in each bar. However, in this piece there is one quarter note in the first bar. The first bar must, with the FM Music Composer, be completed with rests or the position of the bars will be incorrect. The rests are entered before the notes. In the first bar, there is one quarter note. Therefore, the bar can be completed by entering 5 quarter rests, or equivalently, as shown here, by one whole rest and one quarter rest.

Press the following keys after confirming that the input mode is the Note mode. First, enter a whole rest by pressing the 1 key while the SHIFT key is pressed. A whole rest mark ▼ will appear on the screen. Next, input a quarter rest by pressing the 3 key while the SHIFT key is pressed. If an input error is made, press the DELETE key and re-input the data.

Now it is time for the first note to be entered. Because this is a quarter note, the 3 key is pressed for the note ♩ as displayed on the menu. The pitch is D so the B key is pressed. A D quarter note will appear on the screen. The next note is a B dotted half note. The 2 key is pressed for the note ♩ followed by the 8 key. The / key, corresponding to B, is pressed. The next note is exactly the same so the / key is pressed again. The note following this has a tie mark attached to it (the tie mark combines the time values of the notes which it connects). The Y key is pressed for the tie mark followed by the / key. The tie mark is cancelled before entering the second note by pressing the Y key again.

Fig. 22

The rest of part 1 is entered in this manner. Pressing the @ key will allow the notes to be heard as they are entered .

(5) Playing the piece

The following procedure plays back the composed score.

(1) Press the SELECT key to switch the input mode to the Command mode.

(2) Input either the F5 key or "play" and then press the RETURN key.

Playback should now begin. A certain period will pass between the time the RETURN key is pressed and the sound is heard, because rests were input at the beginning of the piece. Playback begins immediately when there are no rests.

The next step is to enter part 2.

Enter "part = 2" and press the RETURN key. Part 2 will be selected.

Enter the key signature and time signature for part 2. These must be entered for every part.

Press the SELECT key to switch the input mode to the Note mode.

The input is the same as for part 1. Two dotted half rests are entered, because the first bar is made up entirely of rests. There is a sharp on the D in the third bar. This is entered by pressing the H key. The pitch of the B note in the seventh bar is one octave lower. This is entered by pressing the F key before the note is entered, lowering the cursor by one octave, and then pressing the / key. The : key is pressed before entering the next B note, raising the cursor one octave.

Set the unit to the Command mode after part 2 has been entered and play back the part.

The final step is to enter part 3. This part is written with the bass clef.

The position of C in the bass clef is shown below.


Fig. 23 bass clef

Same pitch
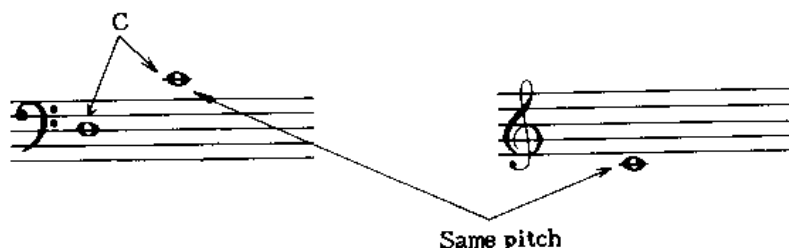
The last note will be G but an octave lower than the final G of part 2. The F key is pressed to lower the pitch and the note is entered. The final note in the seventh bar is even one octave lower but pressing the F key again will not lower the range. To remedy this, switch to the Command mode and input lod followed by the RETURN key. lod will be displayed on the score and all notes input after this mark appears will be one octave lower than the score indicates. Return the input mode to the Note mode and enter a note having the same pitch as the previously input G note.

All of the notes have now been entered. Input "play" and listen to the piece.The default piano voices will be heard. The voices are the next things to be set.

Voice setting starts from part 1. Switch the screen display to part 1 and set the unit to the Note mode. The cursor will appear on the left edge of the score. Press the INS key and the shape of the cursor will change from * (green) to + (red). This indicates the insertion mode in which notes and other parameters can be inserted at the position of the cursor. Switch the input mode to the Command mode and key in "# = 16" followed by the RETURN key. #16 will be inserted at the cursor position. This sets the voice of part 1 to flute.

Confirm this by playing the piece. Set parts 2 and 3 to various voices and listen to them (refer to page 54 for the voice numbers).

Fig. 24
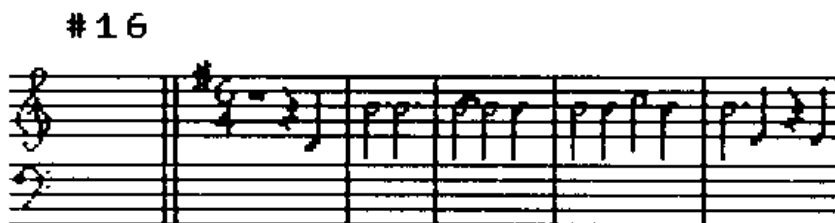
I-4   SAVING PLAYBACK DATA

The score that you have created will be erased if the power is turned off. However, with the FM Music Composer, playback data can be saved onto cassette tape. Connect the CX5M to a cassette recorder according to the instruction manual.

SAVING PLAYBACK DATA

The csave command is used to save playback data onto cassette tape.

(1) Load a cassette tape into the cassette recorder.

(2) Set the input mode to the Command mode.

(3) Save the data by inputting "csave = name". The name can be any combination of up to six alphanumeric characters. csave can be entered by pressing the F6 key (SHIFT key + F1 key).

(4) Start recording onto the cassette tape by pressing the RETURN key.

(5) The cassette recorder will stop after the data has been saved.

LOADING PLAYBACK DATA

(1) Fast forward and rewind operations are not possible when the cassette recorder "remote" jack is connected to the CX5M. Remove the "remote" (black) cable from the remote control jack of the cassette recorder when the tape needs to be rewound or fast forwarded. Re-insert the cable after fast forward or rewind operations have been completed.

(2) Press the STOP key while holding down the CTRL key to interrupt loading or saving. If data loading is interrupted the data in the CX5M will be completely cleared.

(3) It is advisable to make a back-up copy of any cassette tape that has playback data saved on it. This provides an extra copy in case it is damaged.

A back-up copy is not made by dubbing from one cassette recorder to another but instead is produced by loading the data into the CX5M and then saving it onto a new cassette tape. This prevents any distortion of data.

Fig. 25 Copying data (making a back-up)

Cassette recorder		Cassette recorder
Tape to be copied	Memory	Tape to be copied onto

Load → Save →
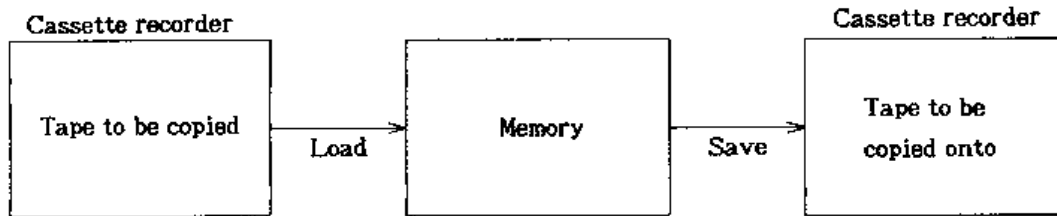
I-5   PRINTING OUT THE SCORE

A hard copy can be made of the playback data exactly as it appears on the screen display. Connect the printer to the CX5M according to the procedure outlined in the instruction manual (use a printer compatible with the CX5M).

(1) Select the part to be printed out.

(2) Switch the input mode to the command mode.

(3) Input "print = n,m". n is the first bar to be printed and m is the last bar. Thus, to print out bars 6 – 33 inclusive, input "print = 6,33". "print = " can be entered by pressing F10 (SHIFT + F5).

(4) Press the RETURN key to start print out operations.

* The print–out is carried out in screen units. Thus, all of the bar last specified which appears in the screen will be printed out.

Fig. 26   Print out example

II-1 EXPRESSION MARKS AND REPEAT SIGNS

DYNAMICS MARKINGS

(1) Dynamics

The following markings are used to express dynamics:

Table 2

ppp		(16)
	very weak	
pp		(48)
p	weak	(80)
mp	moderately weak	(112)
mf	moderately strong	(144)
f	strong	(176)
ff		(208)
	very strong	
fff		(240)

Using these with the FM Music Composer permits dynamics to be added as required.

(1) Set the input mode to the Command mode.

(2) Enter the desired dynamic mark.

(3) Push the RETURN key to complete the input. The dynamics mark will appear on the score.

Input of only the sign will set the dynamics according to the preset value of the symbol. More precise setting of the dynamics is possible over the range of 1 ~ 255. This is set by the following procedure.

(1) Make sure that the input mode is the Command mode.

(2) Set the value in the form of a dynamics marking followed by an equal (=) sign and the set value (for example, f = 180)

(3) The dynamics marking and the set value will appear on the score. The preset values are shown in Table 2. Input of these values will determine the dynamics irregardless of the dynamics signs entered. For example, input of "f = 5" will provide a level weaker than ppp.

(2) Changes in dynamics

The following markings are normally used to indicate changes in dynamics during the performance of a piece. They can also be used with the FM Music Composer for the same purpose.

◁══════ (crescendo) increase volume

══════▷ (decrescendo) decrease volume

(1) Set the input mode to the Command mode.

(2) Input the change in dynamics by the < key and the > key according to the following:

< (=n) crescendo

> (=n) decrescendo

    n is a number in the range of 1 to 255. The smaller n is, the faster the dynamics change (refer to page 53 for details). If n is omitted, the previously set value for the current part will be used (n is set to 12 when the part is first set).

(3) Press the RETURN key to complete data input. > or < will appear on the score (and the set value).

(3) Accents

The following markings are used to emphasize certain notes . These markings will affect only the following note.

An ^ (accent) adds a specified emphasis value to a note when it is played. If the value is omitted, the value already set in that part is used (the initial value is 16).

In sfz (sforzando), the note is played at the set level regardless of the present value. If the value is omitted, the value already set in that part is used (the initial set value of the part is 255, the maximum emphasis).

Input procedure

(1) Set the input mode to the command mode.

(2) Input the emphasis marking according to the following:

    ^ (=n)

    sfz (=n)

    n is the value of the desired emphasis which is set as needed.

(3) Press the RETURN key to complete the data input. The mark (and set value) will appear on the score.

* Note that some voices, such as PORGAN 1, 2 etc., will not be affected at all by the accent markings. The above accent parameters cause changes in velocity dynamics. Thus, the set velocity sensitivity value of the voices created using the FM Voicing Program will determine the degree to which these voicestones are affected by the accents. Increase the set value to increase the sensitivity to changes in emphasis.

TEMPO MARKINGS

The tempo markings will affect all parts. Enter them in part 1.

(1) Tempo

The playback tempo is set by the following procedure.

(1) Set the input mode to the Command mode

(2) Input the tempo in the form "tempo = n". The value of n (40 − 200) determines the tempo. "tempo =" can be input by pressing only the F9 key (SHIFT + F4 key). n is the number of quarter notes per minute. If "tempo = 60" is input, subsequent playback will have a tempo equivalent to one quarter note per second. The tempo can be changed in the middle of a piece. The tempo will be ♩ = 120 if a tempo is not set.

(3) Press the RETURN key to complete the input. $\flat$ = n will be displayed on the score.

(2) Changes in tempo

The tempo can be changed during a piece by input of the following markings:

accel   (accelerando)   tempo increases

rit   (ritardando)   tempo decreases

Input procedure

(1) Set the input mode to the Command mode.

(2) Input the change in tempo by entering accel or rit according to the following:

    accel (=n)

    rit   (=n)

n is a number in the range of 1 to 255 which sets the rate of change when necessary. The smaller n is, the faster the tempo changes (refer to page 53 for details).

If n is omitted, the previously set value of the part is used (n is initially set to 12).

(3) Press the RETURN key to complete the data input. The mark will appear on the score (and the set value).

(3) Fermata

The fermata mark is used to extend a note or rest.

(1) Set the input mode to the Command mode

(2) Enter the fermata in the form "ferm = n". The value of n (1 ~ 16) determines how long the note or rest is extended. The higher the value, the longer the extension. If the value n is omitted, the previously set value is used. n is initially set at 4.

(3) Press the RETURN key to complete the input. $\frown$ n will be displayed on the score.

* The fermata mark temporarily causes the tempo to become 0. If the fermata mark is entered after a note, only the non-voiced part will be extended; the voiced part will not be. non-voiced part will be.

* The length of extension is n times the denominator of the key signature. For example, if "ferm = 3" is set when the key signature is 3/4, the extension time will be equivalent to three quarter notes.

PERFORMANCE PARAMETERS

Note length is indicated for each individual note. However, when a piece is actually performed are various changes are made in the length of notes. For example, notes may be shortened and cut off from each other (staccato $\flat$) or sustained for their full time value (tenuto $\flat$). The following parameters allow for changes in expression.
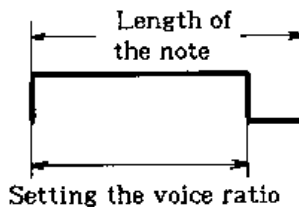
(1) len mark.

Notes are normally voiced with the FM Music Composer for about 4/5 of their actual length (n = 200). The length can be changed by the len mark

Input procedure

The len mark is entered in the form "len = n". n, which can be from 1 to 255, is the value which determines the note length. Input n and press the RETURN key. Ln will be displayed on the score. Setting n to 255 will result in the entire length of the note being voiced. The voiced portion will be about half the note length if n is set to 128.

Fig. 27 len mark

Setting the voice ratio

(2) (staccato)

The len mark sets the length of the voiced portion in proportion to the length of the note. The . mark directly sets the length of the voiced portion.

Input procedure

The . mark is entered in the form ". = n". n is the value which determines the length of the voiced portion. Input n and press the RETURN key. . n will be displayed on the score. n is a value from 1 – 16 with a quarter note having a length of 24. For example, setting the value of n to 6 will result in a voiced portion equivalent in length to a sixteenth note. This mark sets the length of the voiced portion directly and thus the types of notes have no relation to the length of the voiced portion.

Fig. 28 . mark

Setting the length of the voiced portion
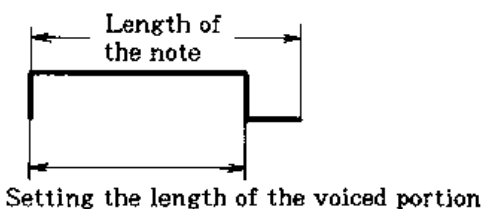
(2) _ mark (tenuto)

The _ mark performs the opposite function of the . mark and directly sets the length of the nonvoiced portion.

Input procedure

The _ mark is entered in the form "_ = n". n is the value which determines the length of the nonvoiced portion. Input n and press the RETURN key. _ n will be displayed on the score. n is a value from 1 – 16 with a quarter note having a length of 24. For example, setting the value of n to 6 will result in the a nonvoiced portion equivalent in length to a sixteenth note. If the note is a quarter note, the voiced portion will be equivalent to a dotted eighth note. If the length of the nonvoiced portion mark is longer than the length of the note, the length of the voiced portion will be set to 1. This mark directly sets the length of the nonvoiced portion; the types of notes have no relation to the length of the voiced portion, which always remains constant.

Fig. 29 _ mark
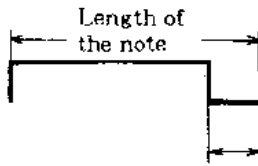
Setting the length of the nonvoiced portion

* There is a close relationship between the len mark, the . mark, and the _ mark. Input of any one of these will alter the note length. The voiced portion can be returned to its initial length by the input of "len = 200".

* The voiced portion occurs, to use the example of a keyboard instrument, while the key is being depressed. With some tones, there may be some residual sound output during the nonvoiced portion.
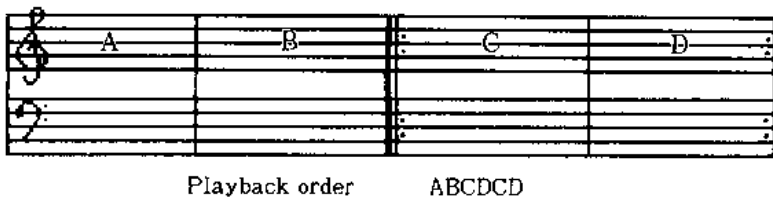
REPEAT SIGNS

The following symbols are used to indicate that a certain portion of a piece is to be repeated. This saves both time and memory space since that portion does not need to be entered twice.

(1) Simple repetition

The section between the 0 and 0 signs is repeated.

Fig. 30

Playback order   ABCDCD
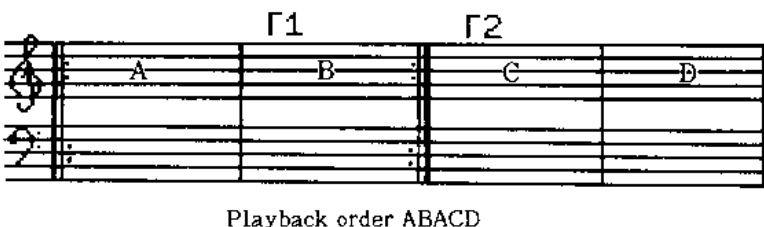
These signs are entered as follows:

The beginning of the section is marked as "rpb (= n)". n (2 ~ 255) is the value which determines the number of times the section is going to be repeated. "n" can be omitted if the section is only going to be repeated once (played twice). Press the RETURN key to complete input. The ‖: mark (and repeat number) will be displayed on the score.

(2) The end of the section is marked rpe. Press the RETURN key to complete input. The :‖ mark will be displayed on the score. rpb is the abbreviation for "repeat begin" and rpe is the abbreviation for "repeat end".

(2)

The ‖: and :‖ signs which are indicated by ⌐1 and ⌐2 on the score are used when the end of the section to be repeated is different.

Fig. 31

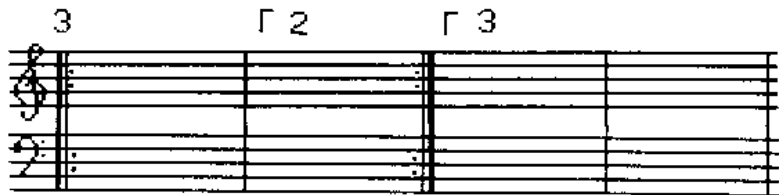Playback order ABACD

31

These signs are entered by the following.

(1) The bar number to which playback continues is entered in the form "rpn = n". n is in the range of 1 – 255.

(2) Press the RETURN key to complete input.   n will appear on the score.

Fig. 32

Input of the score shown in the above Fig. 32 will appear as follows.

Fig. 33

Playback order ABABACD

(3) Da capo (D.C.)

The D.C. mark is used to indicate repeat playback from the beginning to the marked section of a piece.

Fig. 34

Playback order ABCDABC

Input of the D.C. mark will return playback to the beginning of a piece and stop playback at the ∩ mark.

Input procedure

(1) When a return to the beginning of a piece is desired, dc is entered and the RETURN key is pressed. The D.C. mark will appear on the score.

(2) When termination of playback is desired, "fine" is entered and the RETURN key is pressed. The ∩ mark will appear on the screen.

32

(4) Dal segno

The D.S. mark is used instead of the D.C. mark to indicate the return of playback to the marked section rather than the beginning. 𝄋 (segno) mark. If termination of the playback of a piece is desired, "fine" is entered in the same way as for da capo.

Fig. 35

Playback order ABCDBC

Input procedure

(1) The 𝄋 mark is entered by the input of segno. The RETURN key is pressed and the 𝄋 mark will appear on the score.

(2) When a return to the 𝄋 mark is desired, ds is entered. The RETURN key is pressed and the D.S. mark will appear on the score.

(2) When termination of playback is desired, "fine" is entered and the RETURN key is pressed. The ⌢ mark will appear on the screen.

* Playback will return to the beginning of the piece if the 𝄋 mark is not input.

(5) Coda

The position from which playback begins after the D.C. and D.S. signs is indicated by the ⊕ mark. Playback goes from this section to the one indicated by the coda mark.

Fig. 36

coda

Playback order ABCDABEF

Input procedure

(1) When input of ✠ is desired, to coda is entered and the RETURN key is pressed. The ✠ mark will appear on the score.

(2) When input of the coda ✠ is desired, coda is entered and the RETURN key is pressed. The coda mark will appear on the score.

II-2 COMPOUND NOTE INPUT

SETTING THE POLYPHONIC NOTE MODE

The FM Music Composer is normally operated with single notes in each part. The following procedure allows for simultaneous entry of up to eight notes per part (compound note mode). This is useful for the input of chords. The FM Sound Synthesizer unit is capable of generating eight notes at one time; however, the number of available parts decreases by one for every compounded note. The parts are used up in descending order from part 8. For example, if three notes are compounded in part 1, the parts which remain to be used will be 1 – 6.

The poly mark is entered at the beginning of a part to set it to the polyphonic note mode. The poly mark is entered from the Compound mode in the following form:

poly = n   (n = 2 – 8)

The F3 key can be used to input "poly =" and the maximum number of compound notes is entered as n. The RETURN key is pressed to set the part to the polyphonic note mode.

Compound notes are input in the polyphonic note mode by the following procedure.

ENTERING COMPOUND NOTES

The following procedure sets the notes which will be played back simultaneously.

The first step is to select the ♪ mark from the menu (by the menu cursor or by pressing the U key). Subtract one note from the notes to be played together and enter them. When ♪ is set the input notes will have a different shape, being displayed as ♩. Release the ♪ mark and enter the remaining note. In the example shown in Fig. 26, ♪ is first set and C and E are entered. Next, ♪ is released and G is then entered. The order in which the notes are input is not important.

Fig. 37   Fig. 38 Input of Fig. 37
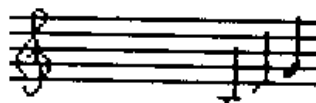
* Simultaneous playback of more notes than are set by the poly mark is not possible. Be sure not to exceed this number.

* Rests are not used in the polyphonic note input mode.

SETING DYNAMICS

The reason notes are not displayed together on the score in the polyphonic note mode is that the dynamics of each individual note can be altered. Fig. 39 shows the procedure for emphasizing the quarter notes which make up the melody.

Fig. 39 Use of dynamics markings with compounded notes

The ^ and sfz marks are only effective for the note directly following the mark even if the notes happen to be compound.

SETING OF TIES

The input of ties for compound notes is shown in the following diagram.

Fig. 40

SUSTAIN

The sustain function can be used with parts set to the polyphonic note mode. The sound of single notes is cut off the instant the next note sounds, preventing the sustain function from operating. The polyphonic note mode must be used when the sustain effect is desired.

The sustain function is set from the command mode as follows.

$$sus = n \quad (n = 1 - 15)$$

Enter n and press the RETURN key. The smaller the value of n, the longer the sustain will last. Conversely, the larger n is, the shorter the sustain will be.

* Input "sus = 0" to release sustain.

Let us try adding sustain to the playback data for Listz's "Liebestraume" which was created in the "Basic" section.

The piece can be improved by adding sustain to part two. Switch to part 2 and input the poly mark to set the part to the polyphonic note mode. Input the sus mark to add sustain. Try setting poly to 3 and sus to 4. Input this data and listen to the piece.

Fig. 41 Input of the sus mark
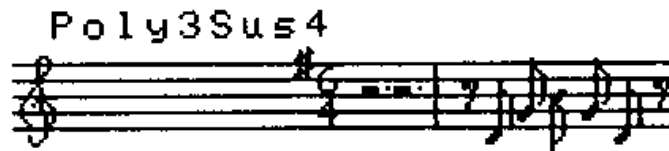
Add sustain to the melody of part 1 in the same way. Input "poly = 2" and "sus = 5".

II-3 TRANSPOSING AND OTHER FUNCTIONS

TRANSPOSING

The score can be transposed and played back. There are two transposition methods: one transposes all parts simultaneously and the other is used to transpose parts individually.

(1) Transposing all parts simultaneously

The mtra mark is used to transpose all parts. The following is entered in part 1:

> mtra = n

The value of n sets the degree of transposition, and can be set in semitone steps over the range of $-$ 24 to 24.

(2) Seperate transposition of parts

The tra mark is used to transpose each part separately. The part to be transposed is selected and the following is entered:

> tra = n

The value of n sets the degree of transposition, and can be set in semitone steps over the range of $-$ 24 to 24.

TUNE

The tune mark is used for fine tuning

when the piece is played together with other instruments. The pitch can be raised or lowered by a maximum one-half of a semitone. Part 1 is selected and the following is entered:

> tune = n

Input the required value of n and press the RETURN key. The value of n can be from $-$ 128 to 127 and the maximum value will cause a pitch change equal to approximately one-half of a semitone. If the mtra mark is set after the tune mark, the tuning effect will be cancelled.

VOLUME

This parameter allows the overall volume of each part to be adjusted separately, and is useful for adjusting the balance between parts.

The following is entered:

> vol = n

Input the value of n to set the volume and press the RETURN key. n is in the range of 0 to 255. The volume is loudest when n is equal to 255.

The volume of all parts is set to 255 when the power is turned on.

The volume parameter does not affect the velocity, but simply adjusts the volume.

II-4 EDITING

Editing refers to the input, as well as the deletion and insertion, of notes and rests. The setting of the parts, deletion, and insertion were outlined in the section on basics. This section will describe other editing functions.

THE SETING OF BARS

When the score is being edited, the section to be edited can be displayed on the screen by scrolling with the cursor. However, if the piece is long, a great deal of time may be required to display the desired section. Setting the bar by using the bar command is a convenient short cut. The input of this command causes the specified bar to be displayed immediately at the beginning of the screen.

This command takes the following form:

$$bar = n$$

In the Command mode, following the entry of "bar =" (simply press the F2 key), enter the bar number n to be displayed and press the RETURN key. The bar number n indicates which bar (from the beginning of the part specified) will be displayed.

DELETING DATA

The clear command is used to clear a part of all data. This command takes the following form:

$$clear = n$$

"clear =" is entered in the Command mode followed by the part where data is to be deleted. The display will switch to the corresponding part when the RETURN key is pressed.

The loaded voice data can be deleted by entering VOICE instead of the part number. If the part number is omitted and only "clear =" is entered, the data of all parts as well as all voice data will be deleted when the RETURN key is pressed. The unit will then return to the initial "power-on" state.

COPYING DATA

The copy command is useful when entering data identical to that which has already been entered. This command allows data to be easily copied, resulting in a considerable savings of time and effort. Copying is carried out in bar units, and is easily carried out from one part to another. The first step is to select the target part. The input position is then set by the cursor. The next step is to enter the copy data in the following form:

$$copy = p, s, e$$

The part number p of the data to be copied is entered after "copy =" (can be entered by pressing only F4) followed by s, the number of the the first bar, and e, the number of the last bar. The respective values are delimited by commas (","). Press the RETURN key to copy the specified data starting from the location specified by the cursor. For example, if copy = 1, 1, 5 is entered when part 2 is selected, the data contained in bars 1 to 5 of part 1 will be copied into part 2. If the data is to be copied to the middle of an already-entered part, change the cursor from * to the insertion cursor 0 to allow data to be inserted in the specified location. Copying can be interrupted while in progress by pushing the STOP key while holding down the CTRL key. Copying will stop at the instant the key is pressed.

PLAYBACK

Although the use of the play command to start playback operations has already been explained, this section will describe this function in greater detail.

(1) Play command

The desired part can played by entering the part number after "part = " followed by the RETURN key. This is useful for checking each part. The tempo signs are normally entered in part 1 and so the tempo during the playback of the other parts will have different values, specifically the initial value (= 120), which can make the individual parts difficult to check. If this turns out to be a problem, a tempo mark can be temporarily set for the other parts and then deleted after they have been checked.

If "t" is entered instead of the part number (play = t), playback of the part displayed on the screen will begin from the position indicated by the cursor; all parameters to the left of the cursor will be ignored. In the polyphonic note mode, for example, chords will not be played if poly mark isn't entered to the right of the cursor.

(2) Interrupting playback

Playback can be interrupted by pressing the STOP key while holding down the CTRL key. Playback will be interrupted and the unit will enter the Command mode.
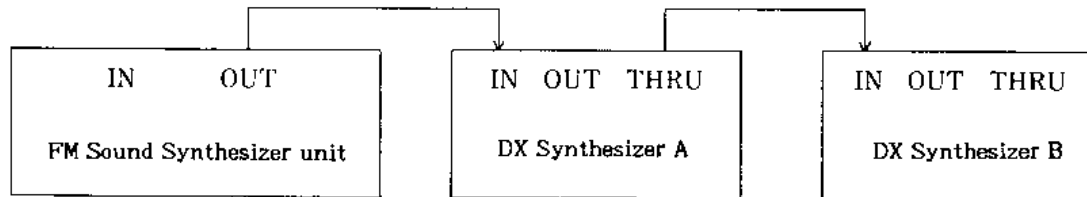
(3) Loop command

Pressing the RETURN key after entering "loop" will repeat playback until the STOP and CTRL keys are pressed. Parts can not be designated in the same way as the play command.

III-1 MIDI

AUTOMATIC SEQUENCING OF OTHER INSTRUMENTS

Automatic sequencing of MIDI compatible instruments such as Yamaha's DX line of synthesizers etc., is possible with the FM Music Synthesizer. Different instruments can be assigned to each part. The FM Sound Synthesizer and the other instruments are connected together by a MIDI (sold seperately) cable as the following diagram shows.

Fig. 42. MIDI connection

```
        ┌──────────────────┐   ┌──────────────────┐
   ┌────┘            ┌─────┘   │            ┌─────┘
   │                 ▼         │            ▼
┌──┴──────────────────┐  ┌──────────────────────┐  ┌──────────────────────┐
│  IN        OUT      │  │  IN  OUT  THRU        │  │  IN  OUT  THRU        │
│                     │  │                       │  │                       │
│ FM Sound Synthesizer unit │  │  DX Synthesizer A │  │  DX Synthesizer B │
└─────────────────────┘  └───────────────────────┘  └───────────────────────┘
```

The THRU jack is used, as shown above, when more than one additional instrument is connected.

The first step in setting automatic MIDI playback is to select the part. The MIDI channel on which that part will be transmitted is then set by the following:

$$mdon = n \quad (n = 1 - 16)$$

n is the MIDI transmission channel. Input of this command will result in all subsequent playback data of the part being output on channel n; the data will be automatically played by the instrument set to the reception channel n. For example, when instrument A , shown in Fig. 42, is set to reception channel 1 and instrument B is set to channel 2, entering mdon = 1 for part 1 and mdon 2 for part 2 will result in the contents of part 1 being performed by instrument A and the contents of part 2 being performed by instrument B. The voices used are set on the instruments actually being played.

MIDI output can be stopped by entering "mdoff". This allows only the desired parts to be output on the MIDI channels. The FM Sound Synthesizer will play simultaneously with the other instruments. The sound of the FM Sound Synthesizer can be eliminated by entering the "sfgoff" command. Entering "sfgon" will restore the sound of the unit.

SINGLE BYTE OUTPUT TO MIDI

One byte of data can be output to MIDI. This is set by the following:

$$sm = n$$

n specifies the data, and is in the range of 0 to 255. See the MIDI reference material to determine the data contents. The following example is used to change the voice of the DX Synthesizer. The format for the program changes is as follows. Two bytes of data are required.

$$1100nnnn \quad (n = 0; ch1)$$
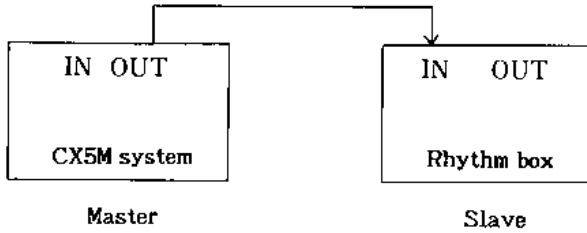
$$0ppppppp \quad (p = 0; Voice 1)$$

The first byte will send the program change code 192 (binary 11000000 converted to a decimal number) added to the channel number minus one. The second byte sends a value equivalent to the voice number minus one. For example, to change the voice of the DX Synthesizer receiving on MIDI channel 1 to voice number 5, enter "sm = 192" followed by "sm = 4".

III-2 SYNCHRONIZED PLAYBACK

SYNCHRONIZED MIDI PLAYBACK

Synchronized performance is possible using MIDI compatible rhythm boxes having a synchronization feature. The CX5M systems can be used as master.
Connections are by the MIDI cable as shown in the following diagrams.

Fig. 43 Using the CX5M system as master


```
   ┌──────────────────┐
   │                  ↓
┌──┴─────────┐    ┌───┴────────┐
│ IN  OUT    │    │ IN    OUT  │
│            │    │            │
│ CX5M system│    │ Rhythm box │
└────────────┘    └────────────┘
   Master             Slave
```

* MSX system means the computer equipped with the FM Sound Synthesizer
Unit and FM Music Computer, connections are made through the MIDI
jacks on the FM Sound Synthesizer Unit.

Enter the msst command at the beginning of part 1. The play command will then start the performance.

The performance can be stopped by entering the msoff command in part 1.

III-3 ADDITIONAL FUNCTIONS

OUTPUT SELECTION

The FM Sound Synthesizer unit has stereo output jacks allowing voices to be assigned to the left output, right output, or both. Voices contained in the FM Sound Synthesizer are normally output from both the right and left output jacks. The following commands allow this to be changed.

outl   output from only the left jack

outr   output from only the right jack

outc   output from both jacks

These commands can be entered in the Command mode for each part. These output selection commands are considered to be tone voice, and so changing the voice data after the input of these commands will select the output jacks set by that voice (both L & R for built-in voices of the FM Synthesizer unit, and whichever output jacks were set for the voices created by the FM voicing Program YRM-102).

CHANGING LFO DATA

The LFO (Low Frequency Oscillator) is an oscillator used to generate low frequencies, which are used to modulate pitch and amplitude, thereby creating vibrato and tremolo effects. There are various parameters which can be set independently for each voice. These are controlled by the following commands.
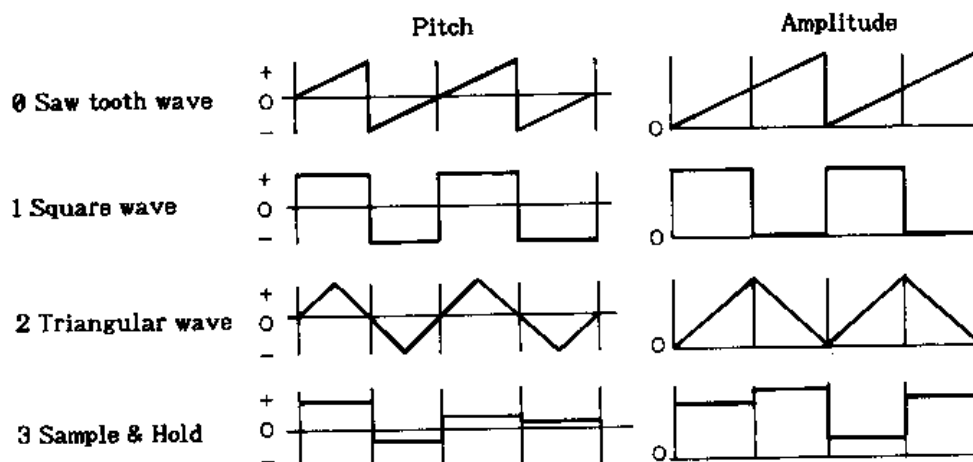
(1) wf

This command changes the waveform of the LFO (modifies the vibrato and tremolo effects)

The form is

        wf = n

The waveform number, n, is entered after "wf =". The value of n is from 0 to 3. The various waveforms corresponding to the values are shown in Fig. 44.

Fig. 44

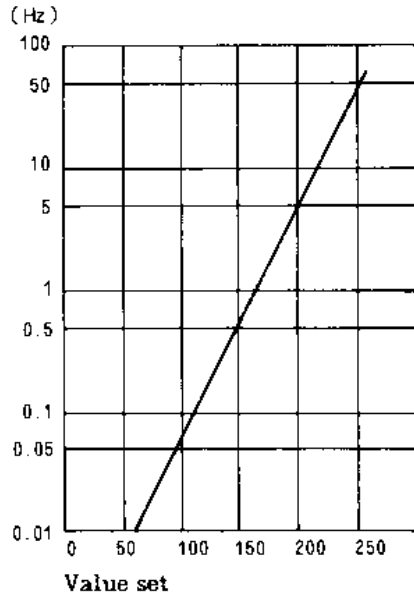
Sample & Hold outputs random values.

(2) lf

This command changes the rate (frequency) of the LFO. The frequency can be changed over an approximate range of 0.008Hz to 53Hz. The form is

lf = n

n is the value which determines the frequency. n can be between 0 and 255. The higher the value of n is, the higher the frequency will become, and the faster the rate of modulation.

Fig. 45

(3) amd

The following command is used to change the degree of amplitude modulation

amd = n

n is the value for determining the level. n can be between 0 and 127. The higher the value of n is, the higher the output level.

(4) pmd

The following command is used to change the degree of pitch modulation

pmd = n

n is the value for determining the level. n can be between 0 and 127. The higher the value of n is, the higher the output level.

* These four commands are used for setting all parts at the same time. If they are used on any one part, all of the other parts will be affected. Also, if the voice is changed after the input of these values, the newly set value will apply regardless of which part it was entered on. There are some voices which will not change.

The following two commands can be used to modulate each part separately. Also, if the tone is changed after the input of these values, the newly set value will apply.

(5) ams

The following command is used to change the sensitivity of the the part (voice) to amplitude modulation.

ams = n

n is the value for determining the level. n can be between 0 and 3. The sensitivity is at the maximum level when n is 3.
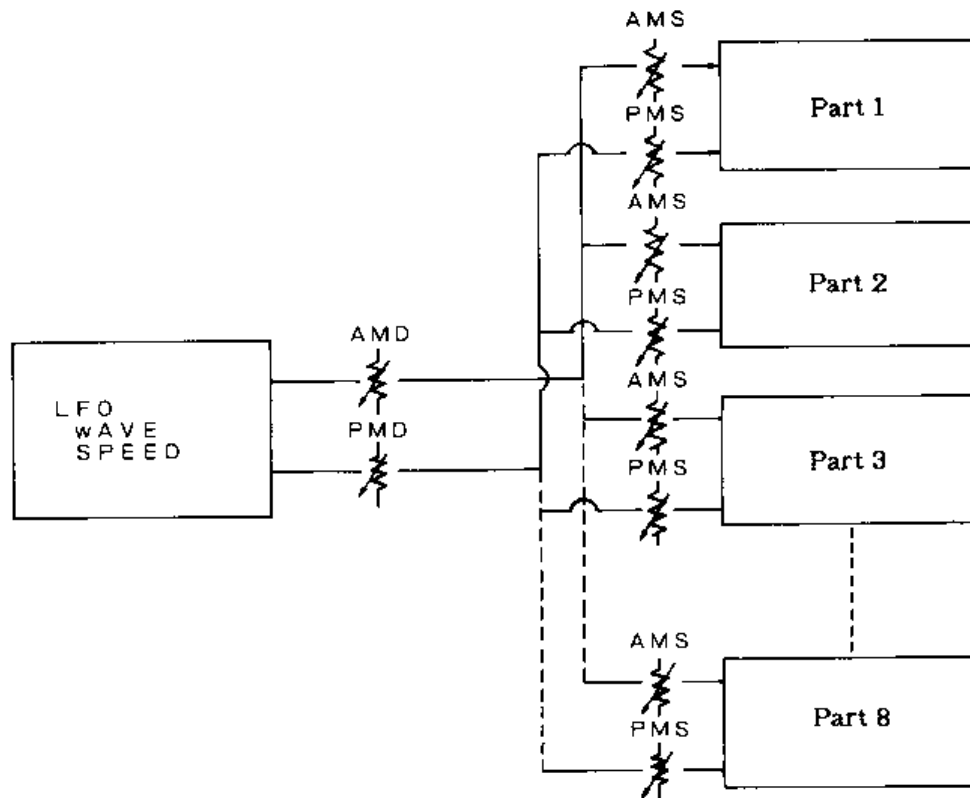
(6) pms

The following command is used to change the sensitivity of the part (voice) to pitch LFO.

pms = n

n is the value for determining the level. n can be between 0 and 7. The sensitivity is at the maximum level when n is 7.

* No pitch modulation can be applied when either pmd or pms is 0. This also applies to amd and ams.

Fig. 46

PERFORMING FROM THE KEYBOARD

Connect the Yamaha Music Keyboard (YK-01) to the FM Sound Synthesizer and the keyboard can be used to play along with the FM music composer, by entering the following commands.

mkon   allows the keyboard to be played

mkoff   stops the performance from the keyboard
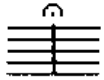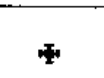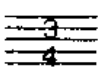
When it is desired to play from the keyboard, set one part aside for the keyboard and enter the mkon command in this part. The voice is determined by the values set for that part. A portion of a part can be used for the keyboard as well.

When entering the "mkon" command, following "mkon =," enter the value n determining the note volume (velocity), so that "mkon = n." n is between 0 and 255. The higher the value of n is, the higher the volume.

IV-1 TABLE OF SYMBOLS (commands)

SYMBOLS AND SIGNS USED FOR CREATING SCORES

	Symbol & Command	Function	Input example (set value)	Display example	Reference page
Pitch markings	1 od (1 octave down)	lowers the pitch of the notes by one octave	1 od	1 0 d	14
	1 ou (1 octave up)	raises the pitch of the notes by one octave	1 ou	1 0 u	14
	2 od (2 octaves down)	lowers the pitch of the notes by two octaves	2 od	2 0 d	14
	2 ou (2 octaves up)	raises the pitch of the notes by two octaves	2 ou	2 0 u	14
	loco (loco)	releases the pitch setting mode	loco	l o c o	14
Tempo markings	accel (accelerando)	gradually raises the tempo	accel＝3 (1 ～255)	a c c e l 3	29
	atempo (atempo)	returns the tempo to its original setting	atempo	a t e m p o	29
	fermata (fermata)	extends the note or rest	ferm＝3 (1 ～16)	⌢3	29
	rit (ritardando)	gradually slows down the tempo	rit＝5 (1 ～255)	r i t 5	29
	tempo (tempo)	sets the tempo	tempo＝140 (40～200)	♩=1 4 0	28
Dynamics markings	< (crescendo)	gradually increases volume	<＝5 (1 ～255)	< 5	27
	> (decrescendo)	gradually decreases volume	>＝5 (1 ～255)	> 5	27
	∧ (accent)	emphasizes only one note (relative value)	∧＝20 (1 ～255)	^ 2 0	28
	sfz (sforzando)	emphasizes only one note (absolute value)	sfz ＝100 (1 ～255)	s f z 1 0 0	28
	ppp (pianissimo)	very quiet	ppp (1 ～255)	p p p	27
	pp (pianissimo)	very quiet	pp (1 ～255)	p p	27
	p (piano)	quiet	p (1 ～255)	p	27

	mp (mezzo piano)	moderately quiet	mp (1 ~255）	m p	27
	mf (mezzo forte)	moderately loud	mf (1 ~255）	m f	27
	f (forte)	loud	f (1 ~255）	f	27
	ff (fortissimo)	very loud	ff (1 ~255）	f f	27
	fff (fortissimo)	very loud	fff (1 ~255）	f f f	27
Performance parameters	· (staccato)	sets the length of the voiced section	. ＝ 5 (1 ~16）	. 5	30
	— (tenuto)	sets the length of the unvoiced section	... ＝ 5 (1 ~16）	_ 5	30
	len (length)	sets the voiced to unvoiced ratio	len＝100 (1 ~255）	L 1 0 0	29
Repeat signs	coda (coda)	designates part to where performance will jump from + mark	coda	c o d a	33
	dc (da capo)	return to the beginning of the piece	dc	D . C .	32
	ds (dal segno)	return to & mark	ds	D . S .	33
	fine (fine)	sets position of ending that follows repetition of sections marked with D.C or D.S.	fine	⌒	32
	rpb (repeat begin)	sets beginning of section to be repeated and number of repetitions	rpb＝ 4 (2 ~255）	4	31
	rpe (repeat end)	sets end of section to be repeated	rpe		31
	rpn (repeat number)	sets ⌐1, ⌐2 etc	rpn ＝ 1 (1 ~255）	⌐1	32
	segno (segno)	sets position to return to with D.S. sign	segno	※	33
	tocoda (tocoda)	sets coda position to be moved to following repetition of sections marked with D.S. or D.C. signs	tocoda	✠	32
Other parameters	key (key)	sets the key	key＝ 2 ♯	♯♯	9
	time (time)	sets the time	time＝3／4	3/4	10

PARAMETER CONTROLLING TONE GENERATION SYSTEM etc.

LFO control	amd	changes level of amplitude modulation	amd＝30 (0 ~127)	Amd30	47
	ams	changes sensitivity to amplitude modulation independently for each part	ams＝3 (0 ~ 3)	Ams3	48
	lf (LFO frequency)	changes frequency of LFO	lf＝200 (0 ~255)	LF200	47
	pmd	changes level of pitch modulation	pmd＝30 (0 ~127)	Pmd30	47
	pms	changes sensitivity to pitch modulation independently for each part	pms＝3 (0 ~ 7)	Pms3	48
	wf (waveform)	changes waveform of LFO	wf＝2 (0 ~ 3)	WF2	46
Output jack control	outc (out center)	sets output to both left and right jacks	outc	OutC	46
	outl (out left)	sets output to left jack	outl	OutL	46
	outr (out right)	sets output to right jack	outr	OutR	46
MIDI control	mdon (MIDI on)	starts output of performance data to MIDI terminal and sets transmission channel	mdon＝1 (1 ~16)	MDon1	43
	mdoff (MIDI off)	stops output of performance data to MIDI terminal	mdoff	MDoff	43
	sm (send MIDI)	outputs one byte of data to MIDI	sm＝192	Sm192	43
Voice generation system control	sfgon (sfg on)	turns on voice generation system of FM Sound Synthesizer unit	sfgon	SFGon	43
	sfgoff (sfg off)	turns off voice generation system of FM Sound Synthesizer unit	sfgoff	SFGoff	43
Music Keyboard control	mkon (mk on)	allows performing on music keyboard	mkon＝200 (0 ~255)	Mkon200	49
	mkoff (mk off)	prevents performing on music keyboard	mkoff	Mkoff	49
Additional parameters	# (number)	sets tone	#＝6 (1 ~96)	#6	15
	mtra (master transposer)	transposes all parts	mtra＝3 (－24 ~24)	M＋3	38

Additional parameters	poly (poly)	sets polyphonic note mode	poly = 3 (2 ~ 8)	Ｐｏｌｙ３	35
	sus (sustain)	sets sustain	sus = 5 (0 ~ 15)	Ｓｕｓ５	36
	tra (transpose)	transposes individual parts	tra = 3 (−24 ~ 24)	＋３	38
	tune (tune)	fine tunes the pitch	tune = 30 (−128 ~ 127)	Ｔｕｎｅ＋３０	38
	vol (volume)	sets volume balance of each part individually	vol = 220 (0 ~ 255)	Ｖ２２０	38

SYNCHRONIZED PERFORMANCE

MIDI	msoff (MIDI sync on)	stops transmission of synchronization signals from MIDI terminal	msoff	ＭＳｏｆｆ	44
	msst (MIDI sync start)	starts MIDI synchronization	msst	ＭＳｓｔ	44

EDITING AND PLAYBACK PARAMETERS

Editing	bar	sets bar to be displayed on screen	bar = 25 (1 − number of input bars)	39
	clear	deletes data	clear = 2 (1 ~ 8 , VOICE)	39
	copy	copies performance data	copy = 1 , 6 , 8	39
	part	sets part to be displayed on screen	part = 6 (1 ~ 8)	9
	loop	start repeat performance	loop	40
	play	starts performance	play (1 ~ 8 , t)	40

Additional parameters	cload	loads tone or performance data from cassette tape	cload = (file name)	23
	csave	saves performance data onto cassette tape	csave = (file name)	23
			print= 6 , 8	25

Changes in < , > , accel, and rit signs

The smallest note which the FM Music Composer can handle is ♪, which is equivalent to 1/96 of a whole note. The intensity and tempo of the < , > , accel, and rit signs, will change by one for each progression of ♪ multiplied by the set value. For example, if < = 2 is set, the volume will be intensified by one step for every two ♪ notes and twelve steps for every quarter note. To calculate the set value from the desired variation in value per every quarter note, divide 24 by the amount of variation. For example, if the tempo is to be slowed down by a factor of six for every quarter note, set rit = 4.

* The intensity stops changing when another dynamics marking is encountered or when either the maximum or minimum value is reached.

* The tempo stops changing when another tempo marking is encountered or when either the maximum or minimum value is reached.

IV-2 TABLE OF VOICES

This table lists internal voices of the FM Sound Synthesizer unit.

Use the voice number when setting the voices with the FM Music Composer.

1 Bright brass	25 Funky clavinet
2 Sonorous brass	26 Harpsicord
3 Trumpet	27 Bell
4 Sonorous strings	28 Harp
5 Real strings also suited for the playing of single notes	29 Short notes are bell, long notes are brass
6 Electronic piano 1	30 Harmonica
7 Electronic piano 2	31 Steel drum
8 Electronic piano 3	32 Timpani
9 Mild guitar	33 Train
10 Funky electric bass	34 Ambulance
11 Mild electric bass	35 Chirping of a small bird
12 Electric organ 1	36 Sound of raindrops
13 Electric organ 2	37 Brass
14 Majestic pipe organ	38 Flute
15 Small pipe organ	39 Guitar
16 Flute	40 Horn
17 Piccolo	41 Funky electric bass
18 Oboe	42 Mild electric bass
19 Clarinet	43 Snare drum
20 Glockenspiel	44 Cow bell
21 Vibraphone	45 Percussion 1
22 Xylophone	46 Percussion 2
23 Koto	47 CSM Reserved for future applications
24 Zitar	48 (there will be no sound output when the FM Music Composer is used)